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# THE OPERATIVE TREATMENT OF APPENDICITIS.

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*presented by the author*

REPRINTED FROM THE  
TRANSACTIONS OF THE PHILADELPHIA COUNTY MEDICAL SOCIETY,  
SEPTEMBER 28, 1891.

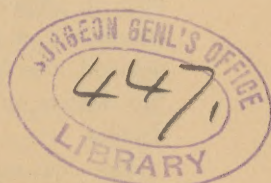




## THE OPERATIVE TREATMENT OF APPENDICITIS.

By THOMAS S. K. MORTON, M.D.

[Special Meeting, September 28, 1891.]



MR. PRESIDENT, LADIES, AND GENTLEMEN: Since being requested by the directors a few days since to open the discussion of the Operative Treatment of Appendicitis, I have taken a glance through the literature of the subject in order to offer, as it were, a consensus of opinion regarding the present status of the subject, as well as to draw conclusions from such personal experience as has fallen to my lot in this direction. Now I find myself embarrassed by the necessity of limiting my remarks to the few moments which are at my disposal and to crowd into them even bare mention of the most salient facts. Hence much must be entirely omitted and other points given scant attention.

The discussion being limited to operative treatment, pathology and diagnosis—perhaps the most interesting branches of the subject even to surgeons—are not to be touched upon except incidentally. But I cannot refrain in passing from saying that as the ratio of appendicular to caecal inflammatory affections is probably 100 to 1, hence that *differential* diagnosis in diseases of this region, which is usually impossible prior to surgical interference, is neither necessary nor important, as operative procedures up to the point of establishing diagnosis are identical for all affections of the caecal region. Again, I would condemn without qualification needle explorations as an aid to diagnosis. The procedure is inherently dangerous, and will furnish no indication that cannot otherwise be obtained.

The number of cases of appendicular disease discovered when we are upon the outlook for them is astonishing. A large proportion of peritonitis cases in males, and especially in children, arise from this disorder; and in all cases presenting abdominal pain, whether acute, chronic, or recurring, no matter where referred, we should think of and examine for possible appendicitis. I have come to be

very skeptical of such conditions as are described as abdominal "cramps," "colic," etc., particularly when of frequent recurrence. Curious as it may appear, yet it is a fact that the great majority of the profession are only now beginning to recognize cases of appendicitis and its consequences as such. Formerly the affection was almost universally diagnosed as anything else except itself. But just in proportion as the disease continues to be more certainly recognized, so surgeons are more early operating upon cases which demand interference, and, as a consequence, the mortality from the disease, as well as from the operation, is very rapidly on the decline.

Keen has said that "the first indication in appendicitis is to call a surgeon," that the physician, who almost invariably first sees the case, and the surgeon may together watch the case, and if operation becomes necessary, interference may be prompt and well timed; while the surgeon will have the great advantage of being already familiar with the case and not disposed to delay the operation that he may acquire such familiarity. Again Mynter has well said that "we are utterly unable to judge correctly from symptoms alone of the extent and severity of appendix lesions, and for this reason alone abdominal section is and must be the safest method of treatment" in many cases.

*When shall we operate?* Judging from the cases that I have observed and from the writings of others, I would formulate as a good working rule: To operate not later than the third day of disease, if the patient up to that time has failed to markedly improve under rest, restricted diet, purgation, and topical applications. Especially should this rule be adhered to in cases where we have failed to move the bowels—these are apt to be the fatal ones. Further than this, we should invariably operate as soon as the presence of pus is assured; when peritonitis is developing or spreading; when signs of sudden rupture of an abscess into the peritoneal cavity appear; and where septicæmia from septic absorption is taking place. In children operation must often be performed earlier than in adults, as with them the malady is more speedy in development, more fatal in tendency, and shows a greater proclivity to involve the general peritoneum.

But let me emphasize the point that *pain* is not a reliable symptom (especially when opiates have been administered) from which to judge as to whether the patient is better or worse; most weight



should be given to the strength, temperature, and condition of the bowels, stomach, and general abdomen.

Mr. Treves urges that operation shall not be done until the fifth, sixth, or later day. But from my reading and experience I think this is too late. He argues thus because few deaths occur before the fourth or sixth day. These cases, however, really begin to die on the third, fourth, or fifth day, although death may not actually take place before the sixth or later day, when the possibility of benefit from operation has passed. If the case is progressing well and operation is being postponed, it should be watched and observed frequently and most carefully, for we cannot predict at what moment an appendix abscess may perforate into the peritoneum or other dangerous complication arise that will instantly demand operation.

If the case is operated upon early the chances of recovery, as a rule, are exceedingly good. The mortality of appendicitis during the first forty-eight hours is almost *nil*, and the operative death-rate at that time is equally low. Later both rates increase, but the former much more rapidly than the latter. The patient, in this disease, is generally strong and well up to the moment of seizure, at which time the danger of operation *per se* is at the minimum. Such mortality as results in operations for appendicitis has been mainly incident to undue delay. When physicians and surgeons generally have learned definitely to recognize such cases as operative at a time before the vital forces have been too much sapped or dangerous complications have arisen, then will the mortality rate of both disease and operation remain steadily at a low figure.

Then again the local conditions from an operative standpoint are much less serious in the early stages. We have at first simply a swollen appendix with infiltration and perhaps a few adhesions. We then do not have to deal with fetid abscess, foul surroundings, and sloughing tissues which may have given rise to intestinal gangrene and other complications, as well as to the impossibility of securing primary union of the wound. Hernia is more common as a sequel in cases where the operation is performed late and where the surroundings are gangrenous and we can only secure healing by secondary intent.

The cry of every writer is for earlier operations. I have found no surgeon who regrets having operated early, but almost all mourn cases that were operated upon too late. No case appears where a mistake in diagnosis has been made, despite the awful array of affections which has been drawn up as liable to render uncertain the

recognition of appendicitis. On the other hand very many cases opened with the expectation of finding other disorders have proved to be appendicitis.

*Who shall operate?* The operation for appendicitis may prove to be the most easy; but it is never trivial, often trying and sometimes even baffling the skill of the very best abdominal surgeons. Hence he who undertakes operation for the removal of the appendix for disease should be equal to dealing with any of the complications and emergencies of abdominal surgery. There is scarcely a complication which occurs in abdominal disease that may not be met with in operations upon the appendix. If a man knows only how to reach the appendix, it is not enough; he must be able to cope with any accident or emergency that may arise. Therefore he must have had training in general abdominal surgery.

*How shall we operate?* There are two classes of cases to be dealt with. One, the acute, where there is perhaps abscess, perforation, or general peritonitis; and, second, those where operation is undertaken in the interval between acute attacks as a prophylactic measure. The indications for the latter will be considered separately further on.

The preparations for the operation are usually hurried, on account of the active nature of the disease and the sudden determination that operation has become imperative. Previous purgation, if successful, will make the chances of recovery much more bright, no matter during what stage of the disease operation is performed. Cases where the bowels have been kept open from the outset of attack are always most favorable. Locally the abdomen should be cleansed as for any other operation.

All writers now agree that the incision should be lateral. Median incision is only permissible when diagnosis from other abdominal disease is not clearly made out, as where we have had suddenly developed, violent peritonitis arise without obvious cause. Even should the median incision have been made and the affection prove to be appendicitis, especially if septic, a lateral incision should still be resorted to, for it is exceedingly difficult and dangerous to drain septic appendicitis cases through a median incision, and often it is impossible to deal with complications, or with the appendix itself, except by the more direct route. I am of the opinion that almost any complication arising from appendix or cæcal disease can best be dealt with through the lateral incision. No writer has regretted



making the lateral incision, although many have regretted entering through the linea alba.

This incision should be about three or four inches in length and terminate one inch and a half above Poupart's ligament. It should be carried down to its full extent through the right linea semilunaris until the peritoneum is reached, avoiding if possible the epigastric artery which normally would be situated to the inner side of the lower extremity of the wound. I have seen serious secondary hemorrhage from division of this artery. Having reached the peritoneum, if one does not at once get into an abscess cavity he must exercise great caution not to open the gut by mistake. Sometimes adhesions will be found binding the intestine to the peritoneum in the line of incision, and in these cases it is well to go at once to the lower or upper extremity of the wound, get into the general peritoneal cavity, and work upward or downward, as the case may be, to the cæcum, when all adhesions can be separated by the finger or knife and the peritoneum opened to the full extent of the external incision. Of course the incision should be increased in size if there is any difficulty in getting into the peritoneal cavity, or subsequently if difficulty arises in any manipulation from lack of working room. But as a rule the smaller the incision the better, because of the less risk of subsequent hernia. The head of the colon is then sought out. If now it is found difficult to determine the site of the appendix, the longitudinal muscular bands of the colon may readily be followed down to their termination in the root of the appendix. Then by careful manipulation one can usually trace the appendix, even through a mass of dense adhesions, and dissect it out. As a rule, in acute cases the organ will be found more or less free in the cavity of an abscess with its tip perhaps adherent to omentum or bowel. The appendix is to be dissected out with the finger, and often we do not see it until it is brought out of the wound ready to be ligated off. This manipulation closely corresponds to the modern one of removing the uterine appendages.

Now, what shall be done if the appendix is found to be bound down by a dense mass of adhesions, and if it would take a long dissection and endanger life from the time required to complete the operation? Under these circumstances I would advise that the appendix be left alone, rather than run any great risk of the patient's life to complete an ideal operation. We are often compelled to operate to save life, and that alone, even if we do run the risk (as in leaving the appendix) of recurrence. I do not regard the operation

as complete in any case unless the appendix is removed, and we should never hesitate to dissect out or remove the organ simply for fear of opening up the general peritoneal cavity.

Cases of recurrence of appendicitis, with great violence of symptoms, are upon record where operation had been performed and the appendix not removed. Here, again, we have a parallel with the removal of the uterine appendages. Who considers that he has done a complete operation when he simply drains a pyosalpinx? Yet there is a small (but constantly decreasing) proportion of these cases that must be so treated rather than endanger life by prolonging operation, shock, and anesthesia.

If the appendix can be excised, the question arises as to how we shall deal with it after separating all adhesions. In septic cases it will be found usually impossible to invaginate the stump, after cutting away the appendix, into the cavity of the cæcum and approximate peritoneum over the remaining opening. Where we operate between attacks the appendix, as a rule, can be dealt with in this manner and the invaginated stump retained by a few Lembert sutures approximating the surfaces of the cæcum over the aperture. When, however, the organ and its surroundings are swollen and gangrenous, the conditions are such that it is generally impossible to invaginate the stump. It has seemed quite sufficient in these septic cases to ligate the appendix a quarter of an inch from its root with strong silk, and then cut off both the appendix and the ligature ends. But ligatures will neither become absorbed nor encapsulated where septic conditions are present, and I have seen the threads coming out of the wound months afterward from a persisting sinus or by ulceration. So it occurred to me that we might resort to the old surgical procedure of leaving one end of the ligature hang out of the wound. That experiment I am now trying in a recent case. Chronic ligature sinuses assist in the production of hernia by interfering with solid union.

Frequently the appendix will be found with a mes-appendix. This should be ligated *en masse* or in sections, and cut away from the appendix. Then the appendix is ligated at its base and removed.

Removal of the appendix is almost universally recommended, but Mr. Treves has simply straightened an appendix which he found angulated by adhesions and left it in the wound. Mr. Tait has practised in more than one case splitting open the appendix and inserting a fine drain tube into it. From these instances it will be seen that there exists in some minds an almost superstitious fear of removing



the appendix. Certainly no sentiment can exist concerning the ablation of the appendix such as there is in regard to the ovaries and Fallopian tubes! Having the appendix once in hand, it does not add to the dangers of the operation in the least degree to remove it, while recurrence of the disease is thereby rendered impossible.

Occasionally the appendix is found to have sloughed off at its root, leaving a ragged opening into the cæcum. In one or two cases the edges of the opening thus left have been inverted and closed successfully by Lembert sutures. In others the wound was left entirely open and packed with gauze; an intestinal fistula or artificial anus formed, but in time closed spontaneously. Yet another required a subsequent operation and Lembert sutures before it was cured.

Some surgeons recommend that in septic cases a little flap of peritoneum be sewed across the stump, or that it be tucked under a bit of omentum. I can see no advantage in this. It prolongs the operation and does no good, while by so doing we risk the formation of a secondary abscess pocket. Very many appendix stumps have been simply dropped into the wound again after ligation; fecal fistulæ did not form and the wound closed satisfactorily.

Any portions of gangreous omentum presenting in the wound should also be ligated beyond the junction with healthy tissue and cut off.

Any small openings into the peritoneal cavity may next be sewed up carefully if the general peritoneum does not require drainage.

Then in regard to irrigation. If the general peritoneal cavity has been opened extensively, or if it is septic, it should be thoroughly washed out through the lateral incision. If it has not been involved the abscess cavity and wound alone should be irrigated. Under the latter circumstance we may employ a strong bichloride solution, but if the peritoneum is to be flushed nothing but water should be used.

If the general peritoneum has been septic or extensively opened or manipulated it is essential to use drain tubes to the base of the pelvis. The ordinary straight glass-tubes do not answer well, and rubber is not satisfactory. Here I have a collection of angulated and curved glass tubes, most of which have been used with great satisfaction in appendix cases. The angle makes it possible to get the tube to fit well over the brim of the pelvis, yet not to project awkwardly from the lateral wound. By attaching a few inches of rubber tubing to the end of the ordinary cleansing syringe the bent tube can readily be cleaned.

The suturing of the wound is especially important if the case is

*not* a septic one. Then the tissues should be sutured, layer by layer; this gives the best assurance of firm primary union and the avoidance of hernia. If, however, the wound is septic and drainage or packing is employed secondary union is inevitable. But I would still urge that the wound be as carefully sutured as possible in all cases, leaving ample room for exit of the drain-tube or packing. And I might say, in passing, that simple packing with strips of double cyanide or iodoform gauze will be found to answer all purposes of drainage in cases where the general peritoneum does not also require drainage.

Some surgeons advise using no stitches in septic cases, but simply packing of the entire wound with gauze. But by suturing we can usually secure primary union in a portion of even a foul wound, and temporary stitching has appeared to me to give a certain anchorage and support to the subjacent intestine, which, when the sutures are removed, is more or less retained. The stitches, of course, are to be removed, one or more at a time, when swelling, infiltration, tension, or deficient drainage become apparent. Strips of adhesive plaster should be employed to give the wound support and approximation during granulation.

Complications, such as gangrene of intestine or mesentery, must be dealt with upon general principles of abdominal surgery. If intestinal obstruction complicates the case, the site of obstruction should be ascertained, and the condition relieved, if possible, before closing the wound. Cases in which obstinate constipation has existed up to the time of operation, should be examined during its performance for possible obstruction.

Should peritonitis develop subsequent to operation, and not speedily yield to active purgation, the wound must be reopened, and the abdominal cavity irrigated thoroughly and drained. Continued obstruction could probably be best dealt with through a new median incision rather than through the original wound.

As soon as the patient comes out of ether, if the bowels have not been well emptied before operation, it is my custom to at once begin the administration of one-eighth grain doses each of calomel and podophyllin, at twenty minute intervals, until purgation is accomplished. This usually takes but a very few hours. Later salines may be employed if required.

Full strength peroxide of hydrogen solution has given me great satisfaction for cleansing and washing the wound-cavity when supuration commences and sloughs are forming—it greatly facilitates the separation of the latter.



Persisting fecal fistulæ often close spontaneously in time. Should they not, then reopening of the parts several months later, and suturing of the cæcal or other opening with Lembert sutures is indicated, and has proved successful in several instances.

In conclusion, let me say a word in regard to operations undertaken in the interval between acute attacks, or, what may be termed—

### *Prophylactic Operative Treatment.*

The indications for this measure are: Constantly recurring attacks (usually indicative of the presence of a foreign body in the appendix), which interfere with the individual gaining a livelihood, or render his life a constant burden, worry, and expense; also, where recurrent attacks have taken place in those, as seamen, hunters, explorers, etc., who are liable to be again attacked when they may be out of reach of adequate surgical aid. In this class of patients, operation during quiescence of the disease should be considered, and perhaps urged, by the medical attendant. In most other cases, I do not think excision of the appendix should be often attempted in the quiescent period. We should rather counsel delay until the onset of the next acute seizure, when we can conscientiously urge the removal of the offending organ at once—that is, on the first or second day. This conservative advice is given principally because of the great difficulties and dangers frequently encountered in operating during the intervals of attack when the adhesions are extremely dense. In fact, patients have died as result of the long time required to complete the operation, because of the elaborate dissection required to free the appendix from its matrix of densely organized adhesions. In several instances the very best operators have been compelled to abandon these operations in the interval of attacks, not only without having been able to remove the appendix, but also without having been able to discover the organ in its bed of adhesions.







